

## **REMARKS**

In response to the Office Action<sup>1</sup> mailed March 5, 2008, Applicant respectfully requests reconsideration in light of the following remarks.

### **Status And Disposition Of The Claims**

Claims 1-30 and 33-60, of which claims 1, 30, 59 and 60 are independent, are pending and under consideration on the merits.

In the Office Action mailed March 5, 2008, the following actions were taken:

- 1) Claim 59 was objected to as being directed to non-statutory subject matter;
- 2) Claims 30 - 60 were rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,948,044 (hereinafter, "Chandrasekaran").
- 3) Claims 1 - 29 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Chandrasekaran.

In this Response to the Office Action, Applicant amends the Specification, amends claims 1, 30, 59, and 60, and cancels claims 31 and 32.

### **Rejection under 35 U.S.C. § 101**

In the Office Action, the Examiner rejected claim 59 under 35 U.S.C. 101 as being directed to non-statutory subject matter. Applicant has amended claim 59 to recite, "[a] computer-readable storage medium." Accordingly, the rejection of claim 59 under 35 U.S.C. § 101 should be withdrawn.

### **Rejection under 35 U.S.C. § 102**

In the Office Action, the Examiner rejected claims 30-60 under 35 U.S.C. 102(e) as being anticipated by Chandrasekaran. See Office Action at 3. In order to properly establish that Chandrasekaran anticipates Applicant's claimed invention under 35

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<sup>1</sup> As Applicant's remarks with respect to the Examiner's rejections are sufficient to overcome these rejections, Applicant's silence as to assertions by the Examiner in the Office Action or certain requirements that may be applicable to such rejections (e.g., whether a reference constitutes prior art, ability to combine references, assertions as to patentability of dependent claims) is not a concession by Applicant that such assertions are accurate or such requirements have been met, and Applicant reserves the right to analyze and dispute such in the future.

U.S.C. § 102, each and every element of each of the claims in issue must be found, either expressly described or under principles of inherency, in that single reference. Furthermore, "[t]he identical invention must be shown in as complete detail as is contained in the ... claim." See M.P.E.P. § 2131, quoting *Richardson v. Suzuki Motor Co.*, 868 F.2d 1126, 1236, 9 U.S.P.Q.2d 1913, 1920 (Fed. Cir. 1989). Chandrasekaran does not anticipate Applicant's claimed invention since Chandrasekaran does not disclose each and every element of Applicant's claimed invention.

Specifically, Chandrasekaran does not disclose "updating a logical tree reflecting relationships between virtual volume objects based on the current view and the host system request, the virtual volume objects including first tier and second tier objects, the first tier objects reflecting a relationship between the physical block addresses and one or more logical partitions of virtual volume data and the second tier objects reflecting a logical configuration of the virtual volume," as required by Applicant's amended claim 30.

Figure 7B of Applicant's specification illustrates an exemplary embodiment having first tier objects reflecting a relationship between the physical block addresses (T1 Partitioning Objects 720, 730, 740, and 750) and second tier objects reflecting a logical configuration of the virtual volume (T2 Striping Objects 705, 715; and T2 Mirroring Objects 710, 711, 716, and 717).

The Office Action cited Chandrasekaran at Figure 9, column 1, lines 35 - 67; column 5, lines 3 - 66; column 3, lines 3 - 66; and column 4, lines 1 - 56 to show "updating a logical tree reflecting relationships between the virtual volume objects based on the current view and the host system request." While Chandrasekaran discloses virtualization of physical storage devices, partitioning, mirroring and striping in the cited sections, nowhere does Chandrasekaran disclose the claimed elements of amended claim 30, which recites

- updating a logical tree that reflects relationships between first tier objects and second tier objects, with the first tier and second tier objects further defined to be:
  - "first tier objects reflecting a relationship between the physical block addresses and one or more logical partitions of virtual volume data", and

- “second tier objects reflecting a logical configuration of the virtual volume”;  
and
- “assigning first tier objects to selective ones of the first set of storage processors and second tier objects to selective ones of the second set of storage processors based on the updated logical tree.”

Neither at Figure 9, column 1, lines 35 - 67; column 5, lines 3 - 66; column 3, lines 3 - 66; nor column 4, lines 1 - 56, nor any part of Chandrasekaran are such features disclosed. For at least these reasons, the rejection under 35 U.S.C. § 102 of claim 30, as well as claims 33-58, which depend directly or indirectly therefrom, should be withdrawn.

In addition, for at least the reasons noted above, independent amended claims 59 and 60, which, although of different scope, recite similar elements and were rejected under the same rationale, are allowable under 35 U.S.C. 102(e). See Office Action at page 9. Therefore the §102(e) rejection of amended claims 59 and 60 is improper, and should be withdrawn.

### **Rejections under 35 U.S.C. § 103**

In the Office Action, claims 1-29 were rejected under 35 U.S.C. 103(a) as being obvious in view of Chandrasekaran. Applicant requests allowance of the pending claims in view of the amendments and following remarks.

#### **Standard for the Rejection of Claims under 35 U.S.C. § 103(a)**

“The key to supporting any rejection under 35 U.S.C. 103 is the clear articulation of the reason(s) why the claimed invention would have been obvious . . . . [R]ejections on obviousness cannot be sustained with mere conclusory statements.”

M.P.E.P. § 2142, 8th Ed., Rev. 6 (Sept. 2007) (internal citation and inner quotation omitted). “The mere fact that references *can* be combined or modified does not render the resultant combination obvious unless the results would have been predictable to one of ordinary skill in the art.” M.P.E.P. § 2143.01(III) (emphasis in original). “All words in a claim must be considered in judging the patentability of that claim against the prior art.” M.P.E.P. § 2143.03. “In determining the differences between the prior art and the

claims, the question under 35 U.S.C. 103 is not whether the differences *themselves* would have been obvious, but whether the claimed invention as a *whole* would have been obvious. M.P.E.P. § 2141.02(I) (emphasis in original).

"[T]he framework for objective analysis for determining obviousness under 35 U.S.C. § 103 is stated in *Graham v. John Deere Co.*, 383 U.S. 1, 148 U.S.P.Q. 459 (1966). . . . The factual inquiries . . . [include determining the scope and content of the prior art and] . . . [a]scertaining the differences between the claimed invention and the prior art." M.P.E.P. § 2141(II). "Office personnel must explain why the difference(s) between the prior art and the claimed invention would have been obvious to one of ordinary skill in the art." M.P.E.P. § 2141(III).

The Supreme Court in *KSR Int'l Co. v. Teleflex Inc.*, 82 U.S.P.Q.2d 1385 (U.S. 2007) held that "[t]here is no necessary inconsistency between the idea underlying the TSM [teaching, suggestion, motivation] test and the *Graham* analysis." M.P.E.P. § 2141 (rev. 6, Sept. 2007), citing *KSR* at 82 U.S.P.Q. 2d at 1396. Applicant understands this to mean that when applicable, as here, TSM reasoning may still be applied not only by an examiner but also by Applicant to refute a § 103 rejection.

### **The 35 U.S.C. § 103(a) Rejection of Claims over Chandrasekaran**

In the Office Action, claims 1-29 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Chandrasekaran. Here, a *prima facie* case of obviousness has not been established because the scope and content of Chandrasekaran art has not been properly determined, nor have the differences between the claimed invention and the prior art been properly ascertained. Accordingly, a reason why the prior art would have rendered the claimed invention obvious to one of ordinary skill in the art has not been clearly articulated.

#### **1. The Scope And Content Of Chandrasekaran Has Not Been Properly Determined.**

Chandrasekaran does not disclose each and every element of Applicant's claimed invention. In the Office Action, the Examiner acknowledged that Chandrasekaran fails to teach or suggest "that [virtual volume objects] are used to update the volume during runtime." Office Action at 3. However, the Office Action is

incorrect in asserting that Chandrasekaran teaches “first tier objects reflecting a relationship between the physical block addresses and one or more logical partitions of virtual volume data, and second tier objects reflecting a logical configuration of the virtual volume.”

Chandrasekaran stresses the importance of mapping virtual disk addresses to physical partitions in a virtual disk while recognizing the mirroring, striping, and concatenation characteristics associated with the virtual disk. Chandrasekaran uses indices to allow direct access of a physical partition upon identification of a virtual disk address. See Chandrasekaran Abstract. Accordingly, Chandrasekaran identifies the need to manage information related to virtualization of physical storage devices, including partitioning, striping and mirroring.

However, it does not teach or suggest using tiered objects to “[reflect] a relationship between the physical block addresses and one or more logical partitions of virtual volume data . . . and [reflect] a logical configuration of the virtual volume.” See amended claim 1. The Office Action cites column 4, lines 1 - 56 as support for using tiered objects. However, in none of these paragraphs, nor elsewhere in Chandrasekaran, is described “first tier objects reflecting a relationship between the physical block addresses and one or more logical partitions of virtual volume data and second tier objects reflecting a logical configuration of the virtual volume,” as required by amended claim 1.

Accordingly, the scope and content of Chandrasekaran has not been properly determined.

## **2. The Differences Between Amended Claim 1 And Chandrasekaran Have Not Been Properly Ascertained.**

Chandrasekaran fails to teach or suggest all elements in amended claim 1. In the Office Action, the Examiner acknowledged that Chandrasekaran fails to teach or suggest “that [virtual volume objects] are used to update the volume during runtime.” Office Action at 3. However, amended claim 1 recites other elements that are not found in Chandrasekaran. For example, amended claim 1 recites “first tier objects reflecting a relationship between the physical block addresses and one or more logical partitions of

virtual volume data, and second tier objects reflecting a logical configuration of the virtual volume.” As noted above, Chandrasekaran also fails to teach or suggest first and second tier objects so defined.

Whether or not Chandrasekaran teaches updating the virtual volume at runtime, which was the feature that was cited in the Office Action as the basis of the rejection under 35 U.S.C. § 103(a), incorporating it into Chandrasekaran would not result in the invention recited in amended claim 1 as a whole, because of Chandrasekaran’s failure to teach or suggest first and second tier objects so defined.

Therefore, whether or not updating the virtual volume at runtime was obvious to one of ordinary skill in the art, incorporating it into Chandrasekaran would not result in the invention recited in amended claim 1. Even assuming *arguendo* that it could be incorporated into Chandrasekaran, the Chandrasekaran system would not have the ability to provide tiering of objects and updating of virtual volume using objects as recited.

Moreover, a Chandrasekaran system, modified to update a virtual volume during runtime but lacking tiering with objects so defined would miss the objective of the Applicant’s system, in which information about the relationship between physical block addresses in a set of storage devices and one or more logical partitions of virtual volume data and information about the logical configuration of the virtual volume may be used to dynamically configure a virtual volume associated with a host system.

**3. There Has Been No Clear Articulation Why Using Virtual Volume Objects To Update The Virtual Volume During Runtime Would Have Rendered The Claimed Invention Obvious.**

As discussed above, the scope and content of Chandrasekaran has not been properly determined. Further, as explained above, the Office Action does not accurately describe the differences between Chandrasekaran and the invention recited in amended claim 1. Nonetheless, the Office Action asserts that it would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Chandrasekaran by using virtual volume objects to update the virtual volume at runtime. However, no additional evidence has been raised establishing a

tenable rationale that one of ordinary skill would have been motivated to modify the references so as to arrive at Applicant's claimed invention.

The Office Action asserts "updating volumes is a well known component of volume management. Given that Chandrasekaran teaches other management aspects of the volume, it would have been obvious to include updating specifically."

Whether or not "it would have been obvious to include updating specifically", it does not necessarily follow that performing the updating at runtime, using objects as they are defined in amended claim 1, would have been obvious. Applicant respectfully submits that updating the virtual volume need not only be performed at runtime. Given the other times at which updating could be performed, Applicant asserts that teaching management techniques for virtualizing physical storage does not necessarily teach updating virtual volumes at runtime using objects as defined in amended claim 1.

Applicant submits that while examiners may rely upon what is generally known in the art, they **must provide evidentiary proof** of that knowledge. See *In re Zurko*, 59 U.S.P.Q.2d 1693, 1697 (Fed. Cir. 2001) ("With respect to core factual findings in a determination of patentability . . . the Board cannot simply reach conclusions based on its own understanding or expertise . . . Rather, the Board **must point to some concrete evidence** in the record in support of these findings.") (emphasis is added).

Here, assuming *arguendo* that "Chandrasekaran teaches other management aspects of the volume", and assuming *arguendo* that "it would have been obvious to include updating specifically", Applicant respectfully submits that the Office Action does not contain concrete evidence in the record to support the position that it would have been obvious to include updating at runtime using objects as defined in amended claim 1. .

Further, Applicant respectfully submits that the Office Action does not explain *why* or *how* one of ordinary skill would modify the apparatus of Chandrasekaran so as to arrive at the claimed invention. In particular, the Office Action has not explained at least: (a) *why* one of ordinary skill would modify the steps of Chandrasekaran so as to update the virtual volume at runtime using objects as defined in amended claim 1; and, especially, (b) *how* one of ordinary skill would know to define objects as in amended

claim 1 and then select and arrange the steps of Chandrasekaran such that they are used to update the virtual volume at runtime.

The burden is on the Patent Office to provide some tenable rationale as to *why* and *how* one of ordinary skill in the art would modify Chandrasekaran so as to arrive at the presently claimed methods recited in amended claim 1. In the present case, however, no such rationale has been provided.

At best, the assertions in the Office Action that “updating volumes is a well known component of volume management” and “Chandrasekaran teaches other management aspects of the volume” could be considered no more than assertions that the proposed modification (updating the virtual volume during runtime) could be performed. As noted above, the mere fact that references *can* be combined or modified does not render the resultant combination obvious unless the results would have been predictable to one of ordinary skill in the art.

Applicant further asserts that, even assuming *arguendo* that the Office Action’s assertion is correct that a Chandrasekaran system could somehow be developed to update the virtual volume at runtime, it still does not result in a predictable variation of Applicant’s invention because Chandrasekaran would still lack the elements recited in amended claim 1, namely

- “at least one of first tier objects reflecting a relationship between the physical block addresses and one or more logical partitions of virtual volume data”, and
- “second tier objects reflecting a logical configuration of the virtual volume.”

Further, Chandrasekaran provides no disclosure or motivation as to how to provide first and second tier objects and update the virtual volume using virtual volume objects so defined.

Moreover, a Chandrasekaran system, modified to update a virtual volume during runtime but lacking tiering with objects so defined would miss the objective of the Applicant’s system, in which information about the relationship between physical block addresses in a set of storage devices and one or more logical partitions of virtual volume data and information about the logical configuration of the virtual volume may be used to dynamically configure a virtual volume associated with a host system.



Accordingly, a *prima facie* case of obviousness has not been established with respect to amended claim 1 and the rejection under 35 U.S.C. § 103(a) should be withdrawn.

In view of the foregoing amendments and remarks, Applicant respectfully requests reconsideration and reexamination of this application and the timely allowance of the pending claims.

Please grant any extensions of time required to enter this response and charge any additional required fees to our deposit account 06-0916.

Respectfully submitted,

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